Remarks

This is in response to the Office Action dated April 29, 2004. The Office Action rejected claims 1 and 5 under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 6,256,295 (Callon) in view of "Official Notice". Claims 2 and 6 were rejected under 35 U.S.C. §103(a) as being unpatentable over Callon and further in view of U.S. Patent No. 6,282,170 (Bentall et al.). Claims 3, 4, 7 and 8 were rejected under 35 U.S.C. §103(a) as being unpatentable over Callon and further in view of U.S. Patent No. 6,304,549 (Srinivasan et al.). Claims 1-8 are currently pending.

Claims 1 and 5 have been amended to more particular point out and distinctly claim the invention. In particular, the phrase "permanent virtual circuits" has been changed to "traffic". As such, the measures of network health described in the claims are now more directly related to the network traffic. This claim amendment is supported throughout the application as filed, and no new matter has been added. The claims are allowable over the cited art for the reasons discussed below.

As described in the application, the present invention is directed to a method and system for monitoring the status of a network by a network management system that includes information describing the current network topology including information describing possible restoration routes. From this information, the network management system computes three measures of network health: (1) the sum of unrouted traffic, (2) the sum of traffic whose cost exceeds a prescribed multiple of an optimal route cost and (3) the sum of traffic off an optimal path. Each of these measures relates to a different aspect of network health, and collectively they provide a measure of overall network performance. The method compares the measures of network health to a threshold value and selects an optimum restoration route from the stored restoration routes.

Independent claims 1 and 5 both contain a limitation pointing out the three measures of network health that are computed. Both claims contain the following limitation:

> computing a plurality of measures of network health, including a sum of unrouted traffic, a sum of traffic whose cost exceeds a prescribed multiple of an optimal route cost, and a sum of traffic off an optimal path.

Claims 1 and 5 therefore include claim limitations directed to particular computations. One claimed measurement is "a sum of unrouted traffic" which is a measure of network traffic which cannot be routed to its destination. Traffic may be unrouted, for example, if the path between the source and the destination has failed or if the path between the source and the destination is too congested to carry the traffic (i.e., the links are saturated). Another claimed measurement is "a sum of traffic whose cost exceeds a prescribed multiple of an optimal route cost". In one embodiment, this measure of network health is described in the specification as the computation of "seriously misrouted traffic" whereby the ratio of cost between the shortest route and the actual route is determined. In the embodiment described in the application, if the ratio is greater than 1.5 then the traffic is considered to be seriously misrouted. If the ratio is less than 1.5, then the traffic is considered to be off the optimal traffic path, which is the another claimed measure of "a sum of traffic off an optimal path". Thus, claim 1 contains limitations directed to the computation of these particular measurements, which are not disclosed in the cited art.

The Office Action cites Callon at col. 3, lines 1-4 and 58-67; and col. 5, lines 3-11, 11-20 and 25-25. However, these cited portions do not disclose the claimed limitations of claims 1 and 5. Callon is directed to a method for determining multiple minimally-overlapping paths between a source node and a destination node (Callon col. 1, lines 52-54). The paths determined in connection with the Callon method are used to establish multiple virtual circuits between a source node and a destination node of a network, thereby allowing redundant virtual circuits and fast switch-over in the event of a failure along one of the paths. (Col. 2, lines 48-52). Thus, as can be seen, Callon is directed to determining backup paths to prepare for network problems, but is not directed to monitoring the status of an operating network as in the present invention.

None of the cited portions of Callon disclose the particular claimed measurements of claims 1 and 5. In particular, col. 3, lines 1-4 of Callon merely discloses switched virtual circuits and permanent virtual circuits, but contains no disclosure of any computations. Col. 3, lines 58-67 merely discuss the determination of lowest cost paths. As described in the specification of the present application at page 6, lines 15-18, shortest path algorithms are well known, and are not the subject of the present invention. Callon

at col. 5, lines 3-11, 11-20 and 25-25 (or more generally lines 3-25) merely provides further details of the use of a Dijkstra algorithm to determine the best path between a network source node and destination node. Again, claims 1 and 5 do not claim computations relating to a shortest path algorithm, and as such the cited portions of Callon do not render claims 1 and 5 obvious.

As described above, claims 1 and 5 contain limitations directed to particular computations which are not disclosed in Callon et al. As such, claims 1 and 5 are allowable over Callon. If the Examiner persists in the rejection of claims 1 and 5 over Callon, Applicant respectfully requests that the Examiner more particularly explain how the cited portions of Callon render each of the claimed computations obvious.

For the reasons discussed above, all independent claims are allowable over the cited art. Allowance of all independent claims is requested.

All remaining dependent claims are dependent upon an allowable independent claim and are therefore also allowable. These dependent claims are also allowable because they add additional allowable subject matter as follows.

Dependent claims 2 and 6 are directed to the aspect of the invention of "restoring circuits at a rate parameterized by a value P" and "increasing the value P in the network to decrease the time customers experience unrouted traffic". Thus, these claims are directed to circuit restoration at a particular rate (parameterized by P) and increasing the rate of circuit restoration. The Office Action admits that Callon does not disclose these limitations, and relies upon Bentall et al. as providing the missing disclosure. However, the cited portion of Bentall et al. fails to provide the missing disclosure. First, at col. 3, lines 37-41, Bentall et al. discloses using a local node to select a restoration route which may enhance response. However, there is no disclosure of restoring circuits by a particular rate and increasing the rate as claimed in claims 2 and 6. Further, at col. 4, lines 29-34, Bentall et al. discloses shortening a restoration route, which is different from increasing the rate at which circuits are restored. For these reasons, claims 2 and 6 are allowable over the cited art.
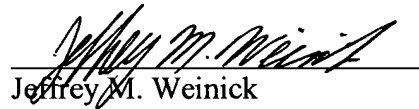
Dependent claims 3 and 7 contain the limitation of "monitoring said measures to sense when bandwidth needs to be added to the network". The term "said measures" relates back to the plurality of measures from claims 1 and 5 respectively. As described

above in connection with claims 1 and 5, the claimed measures include the three particular measures discussed above. There is no disclosure in the cited art of using these particular measures to sense when additional bandwidth is necessary.

Dependent claims 4 and 8 both contain the additional limitation of "derating each edge of the network to have capacity of a predetermined fraction of real capacity". The Office Action in paragraph 12 admits that Callon does not disclose this limitation. The Office Action relies on Srinivasan et al. at col. 15, lines 43-50 and 55-58 (disclosing the lowering of assigned bandwidth) as disclosing this limitation. However, lowering the assigned bandwidth is not the same as "derating each edge of the network to have capacity of a predetermined fraction of real capacity". Srinivasan et al. does not disclose this entire claim limitation (e.g., "predetermined fraction of real capacity"). Since Srinivasan et al. does not supply the missing disclosure, claims 4 and 8 are allowable over the cited art.

For the reasons discussed above, all pending claims are allowable over the cited art. Reconsideration and allowance of all claims is respectfully requested.

Respectfully submitted,

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